

CUSTOMER SERVICE

USP REQUIREMENTS FOR EUROPE

637

INPUT

About INPUT

INPUT provides planning information, analysis and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions. Continuing services are provided to users and vendors of computers, communications, and office products and services.

The company carries out continuous and in-depth research. Working closely with clients on important issues, INPUT's staff members analyze and interpret the research data, then develop recommendations and innovative ideas to meet clients' needs. Clients receive reports, presentations, access to data on which analyses are based, and continuous consulting.

Many of INPUT's professional staff members have nearly 20 years experience in their areas of specialization. Most have held senior management positions in operations, marketing, or planning. This expertise enables INPUT to supply practical solutions to complex business problems.

Formed in 1974, INPUT has become a leading international planning services firm. Clients include over 100 of the world's largest and most technically advanced companies.

Offices

NORTH AMERICA

Headquarters
1280 Villa Street
Mountain View, CA 94041
(415) 961-3300
Telex: 171407
Fax: (415) 961-3966

New York
Parsippany Place Corp. Center
Suite 201
959 Route 46 East
Parsippany, NJ 07054
(201) 299-6999
Telex: 134630
Fax: (201) 263-8341

Washington, D.C.
8298C, Old Courthouse Rd.
Vienna, VA 22180
(703) 847-6870
Fax (703) 847-6872

EUROPE

United Kingdom
INPUT
41 Dover Street
London W1X3RB
England
01-493-9335
Telex 27113
Fax 01-629-0179

ASIA

Japan
FKI
Future Knowledge Institute
Saida Building,
4-6, Kanda Sakuma-cho
Chiyoda-ku,
Tokyo 101,
Japan
03-864-4026
Fax: 011-03-864-4114

INPUT®
Planning Services for Management

600102

NOVEMBER 1987

CUSTOMER SERVICE USER REQUIREMENTS FOR EUROPE - 1987

NPUT®

Researched by
INPUT
41 Dover Street
London W1X3RB
England

Published by
INPUT
1280 Villa Street
Mountain View, CA 94041-1194
U.S.A.

**Customer Service Programs in Europe
(CSPE)**

***Customer Service User Requirements for
Europe - 1987***

Copyright ©1987 by INPUT. All rights reserved.
Printed in the United States of America.
No part of this publication may be reproduced or
distributed in any form or by any means, or stored
in a data base or retrieval system, without the prior
written permission of the publisher.

CURE • 519 • 1987

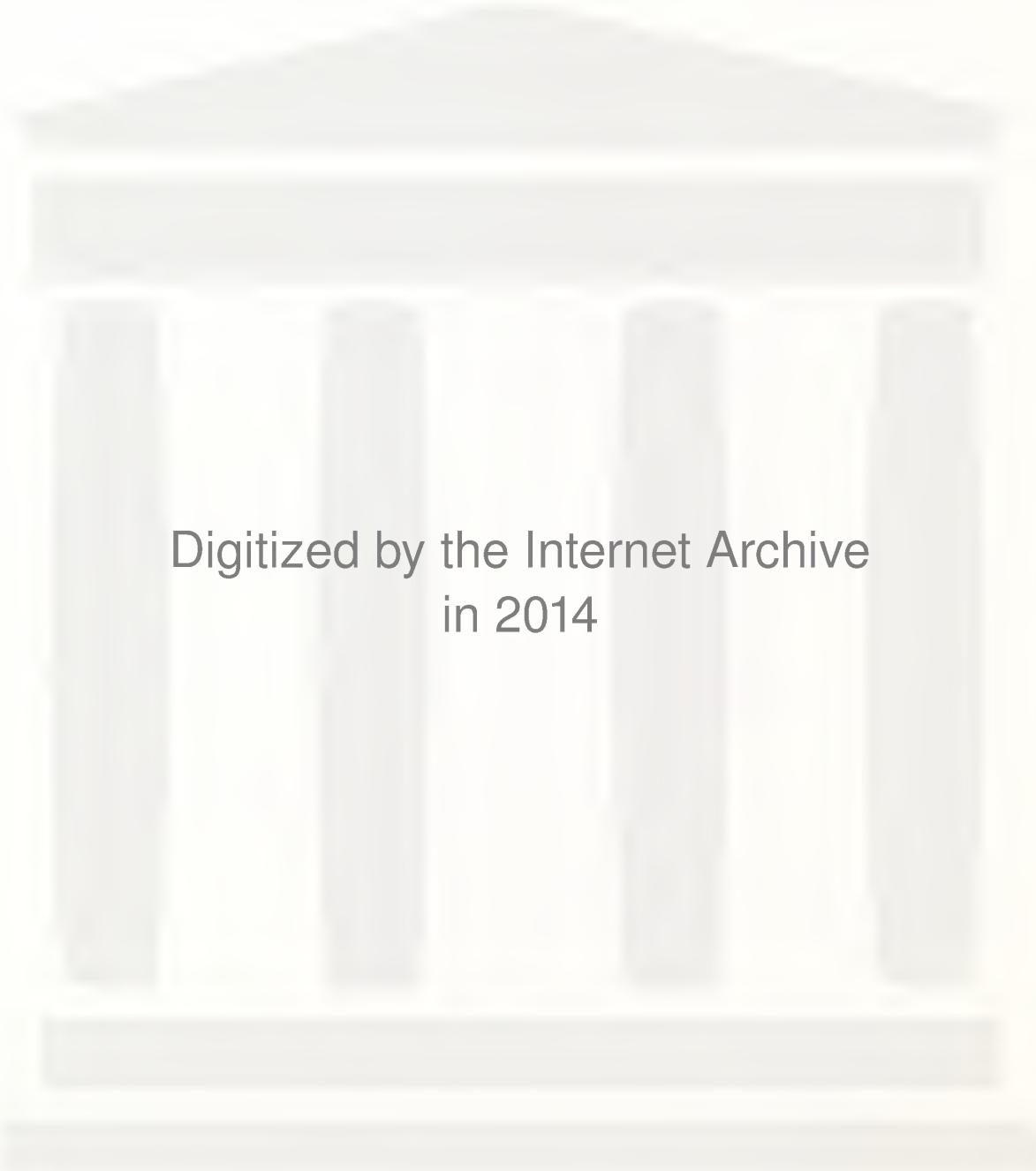
Abstract

The 1987 report on the Customer Service User Requirements for Europe examines the changing pattern of technology and its effect on the business community, as well as the effect on service strategies to keep market share.

Information from over 1,250 users is presented, giving insight into the customer perceptions of the service they are now getting and also their views of the future.

INPUT further evaluates the current market situation and how the service maintenance industry may respond to those continuing and emerging needs.

The report consists of 69 pages, including 40 exhibits.



Digitized by the Internet Archive
in 2014

<https://archive.org/details/20735CURExx87USProcessing>

Table of Contents

I	Introduction	1
	A. Summary	1
	B. Methodology	1
	C. Report Structure	3
	D. Acknowledgements	4
<hr/>		
II	Executive Overview	5
	A. User Requirements for Hardware Support	6
	B. User Requirements for Software Support	7
	C. Rating for Other Existing Services	8
	D. User Requirements for Extra Services	8
	E. Who Does the Maintenance and Support	10
	F. How TPMs Meets User Requirements	11
	G. One-Shop Maintenance	12
	H. System Availability and HW Maintenance	13
	I. Software Support	13
	J. Software Fixes	15
	K. Software Fix Response Times	16
	L. Future Expectations	17
	M. Players in the Marketplace	18
	N. Strategic Pointers	19
<hr/>		
III	Players in the Marketplace	21
	A. Manufacturers and Vendors	21
	B. Third Party Maintenance	25
	C. Leasing Companies	28

Table of Contents (Continued)

	IV	The Changing Scene	29
		A. Batch and Real Time	29
		B. Reliability	31
		C. Quality	32
		D. Diagnostics	33
		E. The Costs and Actuality of Maintenance	33
<hr/>			
	V	User Feelings	39
		A. Customer Care	39
		B. Reliability and Cost	40
		C. Cover and Response	40
		D. Software Training and Productivity	42
		E. Summary of Prime User Requirements	46
<hr/>			
	VI	Manufacturers and Vendor Response to User Feelings	51
		A. Technology	51
		B. Cover and Response	51
		C. The Future, from Current Maintenance Perceptions	52
<hr/>			
	VII	Todays Opportunities	57
		A. The Business of Maintenance	57
		B. The Practice of Maintenance	57
		C. Further Maintenance	58
<hr/>			
	VIII	Summary	65
<hr/>			
	A	Appendix	69

Exhibits

I

-1 Sample Distribution by Country

2

II

-1	Prime Hardware User Requirement is 'System Up'	6
-2	Prime Software User Requirement is 'Speed of Fix'	7
-3	Ratings for Other Existing Services	9
-4	Training is Tops for Extra Services	10
-5	The Manufacturer is Favourite for HW & SW Support	11
-6	TPMs are Cost-Effective and Convenient	12
-7	Users Beginning to Want One-Shop Maintenance Contracts	13
-8	Availability and Maintenance	14
-9	Public Sector and Construction Most Satisfied	14
-10	Software Fixes Take too Long	15
-11	Very Good and Very Bad Figures for Software Fix Responses	16
-12	Future Expectations	17
-13	Players in the Marketplace	19
-14	Strategic Pointers	20

III

-1	Preference for One-Shop Servicing	22
-2	Number of Respondents Preferring Only One Contractor	23
-3	Respondents Preferences for Software Maintenance	24
-4	Why Respondents Use TPM	26
-5	Why Respondents Do Not Use TPMs	27

IV

-1	Hardware Maintenance and Systems Availability	30
-2	Hardware Response & Repair	34

Exhibits (Continued)

-3	Software Response and Repair Time	35
-4	The Changing Scene	37

V

-1	Aspects of Hardware Maintenance	41
-2	Software Support by Sector	43
-3	Software Support by Supplier (1)	44
-4	Software Support by Supplier (2)	45
-5	Software Support by Telephone	47
-6	Fix Time Acceptability for Software	48
-7	Prime User Requirements	49

VI

-1	Customer Rating of Suppliers Service (1)	53
-2	Customer Rating of Suppliers Future Service (2)	54
-3	Strategic Possibilities	56

VII

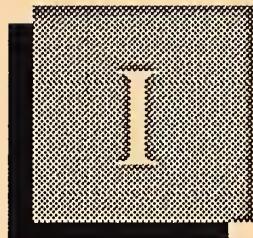
-1	Interest Levels for Other Services	60
-2	Interest Levels for Other Services (Cont'd)	61
-3	Interest Levels for Other Services (Cont'd)	62
-4	Interest Levels for Other Services (Cont'd)	63

VIII

-1	Today's Opportunities	68
----	-----------------------	----

A

-1	Number of Respondents in Each Cell	69
----	------------------------------------	----



Introduction





Introduction

A

Summary

In a rapidly changing business and technological environment where service revenue has become an important contributor to company well-being, it is continually important to assess the role of maintenance and its strategy, tactics and 'presence' in the marketplace.

This report, *User Requirements for Service Maintenance 1987*, examines user perceptions about the level of service they are currently receiving, or want to receive, and what the manufacturers, vendors, and TPMs are doing about these attitudes and requirements.

There is also a detailed examination of the items of service which, in the view of INPUT and derived from user and vendor research, will form the strategic base for the future.

In addition, the market opportunities are highlighted, together with strategic pointers for the next five years.

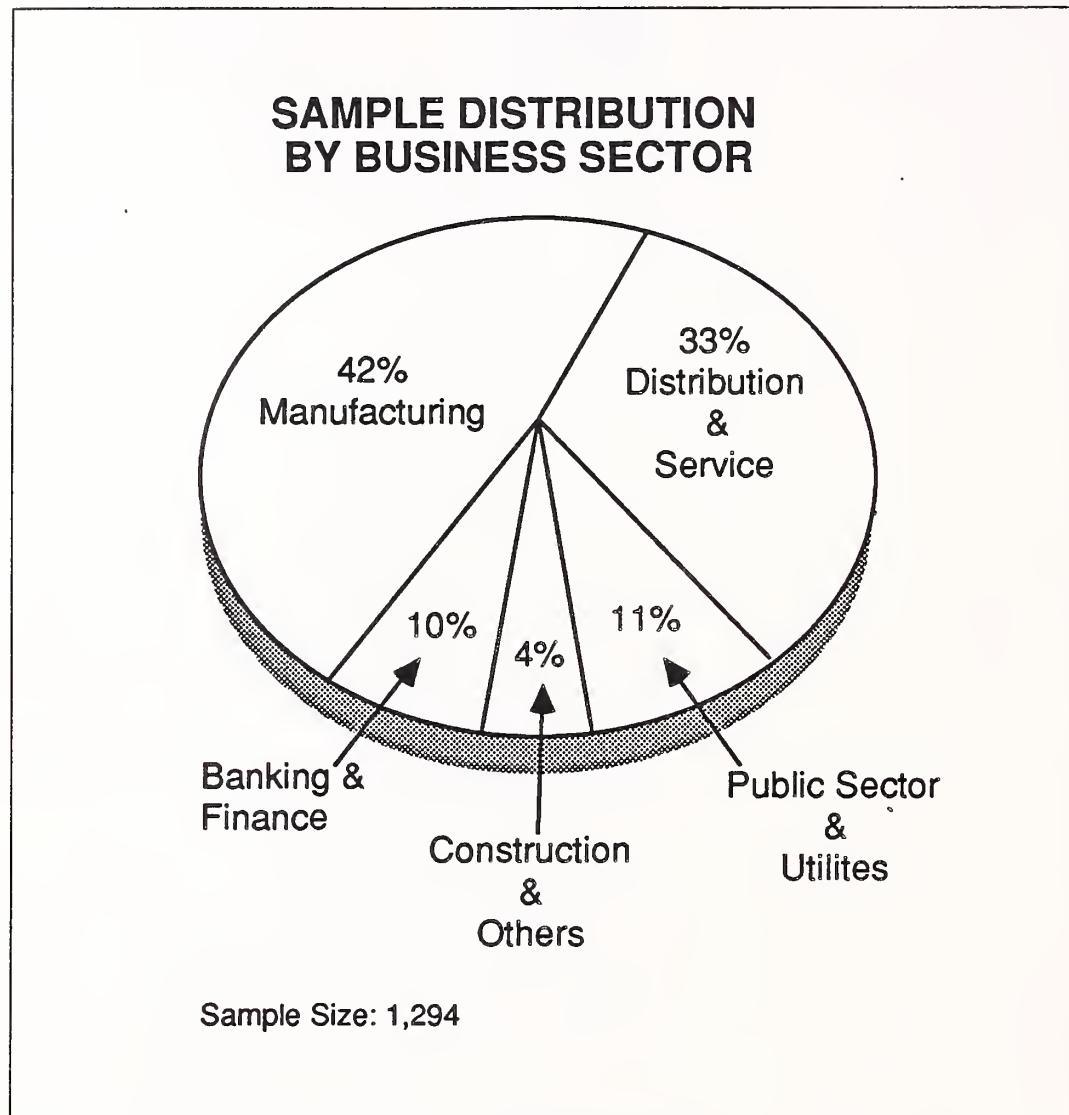
B

Methodology

This report, produced as part of the INPUT 1987 Customer Service Programme for Europe, is based on research carried out during the first half of 1987; the distribution of the sample by country is shown in Exhibit I-1.

This research has comprised some 1,294 telephone interviews with computer users and ongoing consultations and discussions with computer manufacturers, vendors, and service houses.

EXHIBIT I-1



In particular, this research addressed the changing pattern of customer service along with the underlying causes and, of course, possible service company responses to this change.

There is, in addition, much data which can be analyzed in different ways, and INPUT will be pleased to discuss the use of this with any interested clients.

All satisfaction and importance ratings are expressed on a scale of 0 - 10 where:

- 0 represents appalling or of no importance.
- 10 represents excellent or of top importance.

Satisfaction indices are the ratio of satisfaction to importance where:

- 1 and above represents full satisfaction.
- 0.9 and below represents undersatisfaction.

C

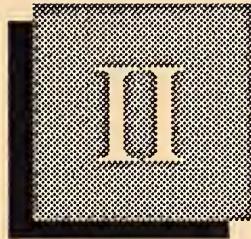
Report Structure

The report is structured in the following way:

- Chapter II is an Executive Overview pulling out the key points for the busy executive.
- Chapter III describes the main contenders in the service marketplace and what the pressures are upon them, and includes data about one-shop maintenance and TPMs.
- Chapter IV details the changing business and technological scene, and then goes on to formulate the effect these changes are likely to have on maintenance. Data on availability and fix times is included.
- Chapter V reviews the response from the INPUT user survey for 1987 and draws the conclusions related to the maintenance market.
- Chapter VI reviews what the manufacturer, vendor, and service company feel about what the users are saying and what they feel must be their reaction to both user and technology. Detailed supplier data is presented.
- Chapter VII concentrates on the market opportunities existing in the changing environment and details the customer interest levels.
- Chapter VIII examines the strategic pointers arising from the market research and from known technological advances and production methods.
- Chapter IX summarizes the conclusions from the survey and the body of the report, giving INPUT's recommendations where appropriate.

D**Acknowledgements**

INPUT thanks all those who took part in this research, both individuals and companies, and any enquiries about the subject matter, or suggestions for improvement, will be welcomed.



Executive Overview



Executive Overview

The Executive Overview is designed in a presentation format in order to:

- Help the busy reader review the report findings quickly.
- Provide ready-made presentation material, complete with script, to facilitate group communication and initiate discussion.

The key points of the report are summarized in Exhibits II-1 through II-12, along with the relevant commentary.

The sample size for the total survey was in excess of 1,250, and for exclusive TPMs the number was 71.

All ratings are expressed on a scale of 0-10 where:

- 0 represents appalling or of no importance.
- 10 represents excellent or of top importance.

Satisfaction indices are calculated on the principle of the ratio of satisfaction rating to importance rating and where:

- 1 and above represents full satisfaction.
- 0.9 and below represents under-satisfaction.

A

User Requirements
for Hardware Support

The users' prime requirement is for their system to be up and running, and this is reflected in the figures for importance and satisfaction shown opposite in Exhibit II-1.

Spares availability and engineer skill level scores nearly nine out of ten, but there is a significant undersatisfaction of the requirement.

The next three in order of ratings are also related to system up-time. These are escalation, call handling, and back-up support.

With related figures for the software aspect, shown in Exhibit II-2, systems availability is the front runner for service in the users' minds.

More detailed figures are given in Exhibit V-1 later in the report.

EXHIBIT II-1

**PRIME HARDWARE USER REQUIREMENT
IS 'SYSTEM UP'**

	IMPORTANCE	SATISFACTION INDEX*
Spares Availability	8.9	.90
Engineer Skill Level	8.8	.94
Escalation Procedure	8.3	.92
Call Handling	8.2	.95
Back-Up Support	8.2	.95

* A satisfaction index of 0.90 indicates a 10 percent under satisfaction with the service in question.

EXHIBIT II-2

**PRIME SOFTWARE USER REQUIREMENT
IS 'SPEED OF FIX'**

	IMPORTANCE	SATISFACTION INDEX*
Engineer Skill Level	8.8	.92
Telephone Fix Speed	8.0	.91
Hotline	7.7	.95
Software Installation	7.9	.97

* A satisfaction index of 0.92 indicates an overall 8 percent undersatisfaction with the service in question.

B

User Requirements for Software Support As with hardware, the requirement for software support centers round the quickest way of getting the system 'on the air' again.

The highest ratings are given to the technical skill of the engineer and to the speed of fix by telephone; interestingly enough, remote diagnostics is well down the table (8th).

As 'hotline' comes fourth, there is a clear pattern that software users prefer telephone fixes as against the case with hardware, where users mostly prefer to see the engineer on site.

Apparently software users are more sensitive to installation performance than hardware users, as this is also given a high rating.

Maintenance providers should, therefore, consider, with the emergent predictive and fault tolerant systems and the combination of hard and

software skills coming in a single engineer, what the strategy will be to sell a given single approach to the customer.

More detailed information is given in Exhibits V-2 and V-3 later in the report.

C

Ratings for Other Existing Services

From a study of Exhibit II-3, and those in previous pages, it is seen that users tend to attach more importance to those services where they are not completely satisfied.

Conversely, for quite important services such as remote diagnostics and out-of-hours cover, complete user satisfaction is recorded, and the service is relegated to a lower position on the list.

Although this is a psychological phenomenon not specific to field service, it is a feature which field service managers need to address in the compilation of a range of services to ensure that important services (to the business of maintenance) are not starved of resources as the performance of that service improves.

It must be borne in mind that, as the achievement of customer satisfaction is obtained, and the service moves down the rating list, it may **not** become less **physically** important.

D

User Requirements for Extra Services

Training comes out as the top requirement (see Exhibit II-4), i.e., some 100% want training of some kind or other, a clear example of unsatisfied demand.

The interest shown for other services is marginal, although some are already being provided by the major players, and **will** actually be needed, in the view of INPUT, to ensure individual user business survival.

This would indicate that there is a fair degree of customer 'view' training or education still needed.

EXHIBIT II-3

RATINGS FOR OTHER EXISTING SERVICES
ORDER OF CUSTOMER RATINGS DOES NOT
EQUAL IMPORTANCE

	IMPORTANCE	SATISFACTION INDEX*
Operator Training	7.7	0.97
HW Telephone Support	7.6	0.97
SW Capacity Tuning	7.6	0.96
On-Site SW Support	7.5	0.97
Service Administration	7.4	1.00
HW Documentation Quality	7.3	0.92
HW Consultancy	7.1	1.00
Other SW Support	7.1	0.99
HW Remote Diagnostics	6.8	1.00
HW Out-of-Hours Service	6.8	1.00
SW Remote Diagnostics	6.7	0.99
Database Problems Mgmt.	6.5	1.01

* Satisfaction Index is the ratio of Satisfaction to Importance scores.

EXHIBIT II-4

TRAINING IS TOPS FOR EXTRA SERVICES

	WANTING (Percent)	STRENGTH OF INTEREST
Training	100	7.8
Consultancy	57	6.4
Disaster Recovery	46	6.3
Software Evaluation	40	6.2
Media Services	46	5.2
Problems Management	31	4.8
Facilities Management	25	3.6

Note: 7 and above is significant

6 is marginal

3 and below - forget

E

Who Does the Maintenance and Support

There is a clear connection between the responses for hard and software support, and the manufacturer comes out as favourite for providing both types of support (see Exhibit II-5).

The TPM figure for market share across Europe is some 6-1/2%, with no representation on the software side; this is not likely to be a situation which will continue.

Of those respondents who answered a categoric yes or no to the preference for a TPM, 10% answered positively.

For software support a figure of 20% is felt to be low, but there will be gradual movement to out-of-house support as standardization of popular applications and custom work round the standard packages increase.

EXHIBIT II-5

THE MANUFACTURER IS FAVOURITE FOR HARDWARE AND SOFTWARE SUPPORT

	HARDWARE (Percent)	SOFTWARE (Percent)
Manufacturer	84	80
TPM	6	0
In - House	-	20

Percentage of customers using the stated support vendor

F

How TPMs Meet User Requirements

The figures in Exhibit II-6 show that, although cost comes out as the bigger number, convenience and efficiency (taken together as being closely related) are a major factor.

Conversely, only 69% of all respondents were satisfied with their current vendor, and this should be taken as an indicator that the market is not safe and committed to the current manufacturer or vendor.

EXHIBIT II-6

TPMS ARE COST-EFFECTIVE AND CONVENIENT
(Percent of Respondents)

Why Use:	Cost	46
	Convenience	31
	Efficiency	27
	Single Source	4
Why Dont Use:	Satisfied with Current Vendor:	69
	Know Nothing about TPMs	18
	Manufacturers have Service Advantage over TPM	16

TPM Sample Size: 71

G

One-Shop Maintenance

Although manufacturing, finance, and government have low requirements at this time for the one-shop principle, across industry as a whole the concept is growing and will continue to grow (see Exhibit II-7).

Government is beginning to put out tenders for whole-site maintenance, and major suppliers such as DEC and IBM are beginning to act as agents for multi-vendor site maintenance.

The principle is not far different from referring customers to a software house for 'package tweaking.'

The big players will, therefore, need to get their strategies together for the handling of multi-equipment, large sites with both current and obsolete 'foreign' equipment in use.

This will begin to pose a problem to smaller companies and the TPMs, which will need to adopt imaginative policies in order to keep their base.

EXHIBIT II-7

**USERS BEGINNING TO WANT
ONE-SHOP MAINTENANCE CONTRACTS**
(Percent)

Cross Industry	59
Manufacturing	22
Finance/Business	15
Government	7

H**System Availability
and Hardware
Maintenance**

The satisfaction index for systems availability ranges from 1.0 to 0.88, with a reasonably even spread across all industry sectors (see Exhibit II-8).

Of the commercial sectors, as with hardware maintenance discussed below, retail distribution came out least satisfied.

The pattern is clear in that, across all sectors, the customer believes that the service could and should be better; it is the task of the vendor to either change the customer's mind, to improve the service, or to develop the criticality.

I**Software Support**

The spread of satisfaction indices for software support is very similar to those for system availability, but the players with the best and worse figures do differ (see Exhibit II-9).

EXHIBIT II-8

AVAILABILITY AND MAINTENANCE

PUBLIC SECTOR MOST AND LEAST SATISFIED WITH AVAILABILITY	SATISFIED (Percent)
- Public Health Sector	100
- Law and Order	88
RETAIL LEAST SATISFIED WITH HARDWARE MAINTENANCE	
- Public Health Sector	96
- Retail Distribution	84

EXHIBIT II-9

PUBLIC SECTOR AND CONSTRUCTION MOST SATISFIED WITH SOFTWARE SUPPORT

MOST SATISFIED	SATISFACTION INDEX
- Central Government	1.00
- Education	0.95
- Construction	0.95
LEAST SATISFIED	
- Law & Order	0.82
- Local Government	0.85

Based on the ratio of satisfaction to importance:
 A figure of 0.82 indicates an undersatisfaction
 of the service of 18 percent.

This would indicate that there is no 'carry over' effect in operation in the figures, and that they do reflect industry opinion.

That being so, there are again clear areas where attention needs to be paid to improving the satisfaction index, particularly in known critical areas such as banking.

It should be noted that the figures are fairly consistent across companies, with the spread, in critical areas, only 17%.

J

Software Fixes

There is little difference across the industry sectors in the importance given to having a quick fix time.

Exhibit II-10 opposite shows the areas of most importance, and it should be noted that even the education sector rates this highly.

EXHIBIT II-10

SOFTWARE FIXES TAKE TOO LONG

• Take Twice as Long as the Customer Finds Acceptable	
• Banking and Finance are the Worst Served	
• Public Health Best Served	
• Highest Importance to Fix Time Given By:	RATING
- Transportation	9.3
- Law & Order	9.1
- Banking & Finance	9.0
• Lowest Importance Ratings Given By:	RATING
- Education	8.2
- Retail Distribution	8.3

Ratings out of 10

In this context, it should be noted that the acceptable fix time for the education sector comes out at 27 hours against 12 hours for retail distribution; each sector needs a different approach.

K

Software Fix Response Times

As can be seen in Exhibit II-11, there is a very wide range of satisfaction indices, with public health scoring very high and being very well satisfied with the service and public utilities scoring very low with a very poor satisfaction level.

Both public utilities and law & order expected an eight hour response, but experienced an average response time of 25 hours.

The shortest average response time, four hours, was given in the public health sector, against an acceptable 4.3 hours.

EXHIBIT II-11

VERY GOOD AND VERY BAD FIGURES FOR SOFTWARE FIX RESPONSES

OVERSATISFIED	SATISFACTION INDEX
- Public Health Sector	1.08
- Central Government	1.00
UNDERSATISFIED	
- Law & Order	0.33
- Public Utilities	0.33

Index based on the ratio of acceptable hours to experienced hours.

Average Response Time:

- Acceptable 10 Hour (rounded)
- Experienced 18 Hour (rounded)

L**Future Expectations**

To the question of how well the customers believed the maintenance and support vendor would be performing in five years time, there was quite a mixed response, as shown in Exhibit II-12.

It is perhaps not surprising that, with considerable perceived undersatisfaction with many of the existing services, a relatively small proportion believe that service will be excellent in 1992.

However, taking all the positive and not negative comments together, there is a 78% figure for customers who, with all other things equal, are likely to stay with the same vendor.

The marketing expertise will be in evaluating the various market sectors and segments and developing a strategy that differentiates it in the favour of the vendor.

EXHIBIT II-12**FUTURE EXPECTATIONS**

COMMENT	PERCENT
• Excellent	45
• Don't Know	17
• Same As Now	11
• Will Have Changed Kit	9
• Will Be Keeping Up	8
• Will Be Poor	6

M**Players in the Marketplace**

In both the manufacturing and independent maintenance sectors there is a developing tendency to increase size as a means of:

- Maintaining and increasing revenue.
- Making new entry tough.
- Enabling a wider spread of services at a marginal increase of overhead.
- Attaining a 'critical mass' which allows loss leaders and an ability to ride bad patches.

On top of this, service vendors will tend to optimize and maximize the service content of company operations, as the profit generated from this sector can exceed that from the manufacturer itself.

This aspect will put pressure on TPMs to:

- Optimize their services.
- Tailor services to user needs.
- Provide differentiated services.
- Reduce prices.

The ability to compete in this type of situation will tend to force the amalgamation of TPMs in order to create the ability to compete over a wider range of services.

The smaller TPM will, therefore, probably be 'driven' into a smaller and smaller niche. There is now quite a significant movement towards cover for real time applications which is tending to be satisfied in one of two ways:

- Tailored services by all the big players.
- On-site engineer subcontracted by the TPM. With more and more 'good' secondhand equipment coming onto the market, the growth of the leasing companies, who can also tie up the maintenance contracts,

the leasing companies, who can also tie up the maintenance contracts, has been exceptional; a measure of the potential is evidenced by IBM itself moving into this area.

Exhibit II-13 stresses these points.

EXHIBIT II-13

PLAYERS IN THE MARKETPLACE

- Big Players Will Get Bigger
- Vendors Will Maximize Service
- Small TPMs Will Be Squeezed
- Real-Time Users Will Want More Cover
- Leasing Companies May Move In

N

Strategic Pointers

The rapid change of computing technology and better reliability, together with the rise of predictive and expert systems has led to a rapid change in market requirements and the service response needed to meet those requirements (see Exhibit II-14)..

With the technology being partly market-driven and these markets being dependent upon different European economies and cultures, there are different opportunities arising at different times in these countries.

This timing (of the rise and fall of markets) can be used to reallocate resources by a see-saw effect.

While this reallocation of resources is fairly easy in the case of capital and revenue expenditure, the reallocation and direction of engineer and technician skills need careful planning.

It is also worth noting that the world economy is not identical to individual country economies and neither are the forecasts. Each marketplace must be separately planned.

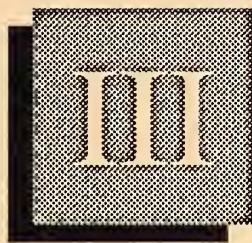
It is evident from this survey, and from all the others previously performed, that the user has a different perception about services than the vendor—it is necessary to train user perceptions or the provision of specific remedies could lead a company down the wrong strategic track.

Finally, both the abilities of service personnel and the strategies for using those personnel need to change to meet the needs of developing industrial and commercial markets.

EXHIBIT II-14

STRATEGIC POINTERS

- Technology Changing Rapidly
- Markets Changing Rapidly
- Different Opportunities In Different Countries
- Can Use the See-Saw Effect (Switch Resources Between Up and Down Markets)
- World Economy Not Equal To National Economy
- User Perceptions Can Be Trained
- Service Abilities Need To Change
- Service Strategies Need To Change



Players in the Marketplace

—



Players in the Marketplace

A

Manufacturers and Vendors

Most major manufacturers, like IBM and HP, will supply the hardware kit direct to the end user, but will also supply via third parties. In the latter case, the servicing of the hardware may also be contracted by the third party.

However, examination of Exhibits III-1 and III-2 shows that some 59% of customers prefer to get all their support from one company and, in 50% of cases, this is the main supplier. This increase with software maintenance, where some 80% would prefer the main supplier or manufacturer (see Exhibit III-3).

In the case of companies such as IBM, strict control is maintained over the technical capabilities and spares stockholding of the vendor in order to protect company credibility and name. In other cases, such as DEC, the manufacturer will give inducements to the actual vendor to refer the maintenance back. However, the approach of Japanese companies such as Hitachi is to 'expect' hardware customers to take out a maintenance contract—these expectations are usually realized.

There is an increasing market in secondhand computers, pioneered by such companies as Atlantic, but into which market IBM itself is likely to move; the hardware sale or lease is, of course, quickly followed by a support contract.

Some smaller companies, and especially the smaller vendors, prefer to concentrate their energies on hardware and software sales, not having the resources to supply an effective national service coverage. These latter companies refer their customers either to the original manufacturer or to a third-party maintenance company.

EXHIBIT III-1

PREFERENCE FOR ONE-SHOP SERVICING
(Number of Respondents in Each Category)

COMPANY	MAIN SUPPLIER		ONE HARDWARE SUPPLIER		TPM	
	YES	NO	YES	NO	YES	NO
IBM	99	18	5	112	18	99
DEC	101	21	11	107	17	101
COMPAREX	2	1	1	2	-	3
OLIVETTI	15	4	2	17	4	15
HONEYWELL/BULL	50	6	4	51	6	49
UNISYS	59	7	10	54	3	61
PHILIPS	4	-	1	3	1	3
ICL	129	16	16	129	6	138
HP	48	5	4	48	1	51
NCR	74	7	6	74	3	77
WANG	24	8	3	29	8	24
SIEMENS	7	2	2	7	1	8
ITL	14	6	6	16	-	19
NIXDORF	23	5	5	23	1	27
Totals	649	106	76	672	69	675
Percent of Totals	50	8	6	52	5	52

MAIN SUPPLIER

= Would prefer the main Hardware Supplier to service all equipment.

ONE HARDWARE SUPPLIER = Would prefer just one of the Hardware Suppliers to service all equipment.

TPM

= Would prefer to use TPM to service all equipment.

EXHIBIT III-2

**NUMBER OF RESPONDENTS PREFERRING
ONLY ONE CONTRACTOR**

SECTOR	PREFER ONE MAINTENANCE	TOTAL (Percent)
Manufacturing: Discrete	161	12
Process	119	9
Banking & Finance	55	4
Insurance	30	2
Other Business Services	107	8
Distribution: Wholesale	78	6
Retail	25	2
Education	16	1
Central Government	6	3
Local Government	34	
Public Sector Health	2	
Law & Order	13	1
Public Utilities	15	1
Other Services	48	4
Transportation	23	2
Other	8	2
Construction & Building	22	2
Overall	762	59

Figures rounded

Sample Size: 1,294

EXHIBIT III-3

RESPONDENTS PREFERENCES FOR SOFTWARE MAINTENANCE

SECTOR	MANUFACTURER	IN-HOUSE	SYSTEMS HOUSE	SW VENDOR	OTHER	SAMPLE SIZE
Manufacturing: Discrete	264	54	14	27	2	323
Process	176	37	16	13	6	225
Banking & Finance	68	19	5	3		87
Insurance	47	6	2		1	50
Other Business Services	121	46	8	6	4	161
Distribution: Wholesale	77	27	12	8	1	108
Retail	41	11	3	2		50
Education	21	4				23
Central Government	16	3	2	1		18
Local Government	39	11	5	2		46
Public Sector Health	3					3
Law & Order	16		2			18
Public Utilities	26	9	2		3	30
Other Services	62	17	7		2	74
Transportation	22	8	4		1	31
Other	13	1	1			15
Construction & Building	20	8	3	5		32
Totals	1032	271	86	74	14	1294
Percentage of totals	80	20	7	6	1	

Multiple answers allowed

INPUT does not believe that there will be any substantial change in the way the above (inferred) strategies operate during the next two years; however, there will be continuing and substantial changes in the size and coverage of the big TPMs.

B

Third Party Maintenance

At the smaller end of the market there are a number of TPMs that have found a market niche in a particular locality, and maybe even down to a particular type of machine in a local district.

On the other hand, customers in general are beginning to want maintenance companies of reasonable size (10 people minimum, \$800k minimum turnover plus growth pattern) to give some assurance that they will not disappear overnight and leave a hiatus in the computer operations.

Hence, although it is believed that smaller companies will emerge in response to local needs from time to time, unless these companies have an aggressive and quick growth plan, they will be either financially squeezed out or acquired by one of the larger TPMs.

Exhibits III-4 and III-5 show the number of customers against each machine supplier who is using a TPM or has consciously decided, for the reasons given, not to use a TPM.

There is a fair spread of positive reasons, and price is only just the front runner.

The overwhelming reason for not using a TPM is that the customer is satisfied with the current support supplier, and that is something to which the supplier should devote energy

There is a concomitant situation existing with smaller software-oriented houses, which are servicing customer needs on the fringes of the large company applications software packages.

These companies have loose agreements with hardware experts and consultants and are having to commit to overall implementation and one-shop servicing (both hardware and software) to those customers without substantial data processing departments.

EXHIBIT III-4

WHY RESPONDENTS USE TPM

COMPANY	R	CONVENIENCE	COST	SINGLE SOURCE	EFFICIENCY	OTHER
IBM	27	4	18	0	6	1
DEC	13	1	7	2	6	3
COMPAREX	1	0	1	0	0	0
OLIVETTI	5	3	2	0	3	0
HONEYWELL/BULL	4	2	1	0	0	1
UNISYS	1	1	1	0	1	0
PHILIPS						
ICL	1	0	1	0	0	0
HP	4	1	2	0	1	0
NCR	4	3	0	1	0	0
WANG	10	7	0	0	2	1
ITL						
NIXDORF	1	0	0	0	0	1
Totals	71	22	33	3	19	7
Percent of Total	100	31	46	4	27	10

R = Number of Respondents

EXHIBIT III-5

WHY RESPONDENTS DO NOT USE TPMS

COMPANY	Count	Satis-fied	TPMs Not Known	Manu. Advan.	Other	Main. Cont.	TPM Has No SW	Considered	TPM Stability	Can't Upset Manu.
IBM	210	127	32	38	29	14	6	17	2	5
DEC	193	113	35	30	28	9	4	14	1	1
COMPAREX	5	3	1	0	0	0	0	0	0	0
OLIVETTI	28	14	3	1	4	4	1	0	0	0
HONEYWELL/BULL	115	78	30	14	13	6	3	4	0	1
UNISYS	111	85	30	19	11	9	4	3	2	0
PHILIPS	11	6	4	2	2	4	0	0	0	0
ICL	197	140	25	32	26	20	13	8	2	2
HP	97	75	18	16	10	4	2	2	0	1
NCR	121	98	13	12	4	6	3	2	3	3
WANG	59	37	9	8	7	3	2	3	1	0
SIEMENS	48	36	15	14	2	6	0	1	0	0
ITL	30	26	2	2	0	0	5	1	0	0
NIXDORF	69	50	11	16	2	8	5	2	0	0
Totals	1294	888	228	204	138	93	48	57	11	13
Percentage of Total	100	69	18	16	11	7	4	4	1	1

MANU. ADVAN. = Manufacturer Has the Advantage

MAIN. CONT. = Maintenance Contract (with Supplier)

CONSIDERED = But Rejected

TPM STABILITY = Have Doubts about Financial Stability of TPM

CAN'T UPSET MANU. = Can't Upset the Manufacturer

This commitment exposes them to grave expertise and financial risk, and the potential customer may well reflect any unease, or lack of credibility, over into the TPM market, again to the detriment of the smaller TPMs.

At the larger end of the TPM business, there is evidence of a growing trend towards cross-industry maintenance, where a national network of service is used by firms like Telub, Kode Computers, and Bell Technical Services to cover, say, computer and telecommunication maintenance.

For further information, reference should also be made to the INPUT report *Third Party Maintenance in Europe, 1986 to 1992*.

C

Leasing Companies

A usual condition of any lease is that the lessee will take out a maintenance contract with a nominated service contractor, and hence the leasing company is in a key marketing position for selling service—and also for picking up a commission on referred sales.

With the rapid turnover of technology, another opportunity is emerging in the shape of perfectly usable, written-down, and replaced obsolete equipment.

As the price of new computer equipment is falling quite rapidly with advanced technology, more equipment is replaced quickly, and there is the opportunity to buy the old equipment at very low prices and give this to a company in exchange for, say, a five-year maintenance contract. Or, the equipment may be leased, at a nominal figure, for the same five-year contract.



The Changing Scene

—



The Changing Scene

A

Batch and Real Time

The service market is reacting to a rapidly changing business environment where loss of up-time is the same as loss of revenue.

Exhibit IV-1, however, shows that there is an average 8% dissatisfaction with the systems availability and an even greater dissatisfaction with the hardware maintenance service.

In the current situation there is strong growth in the banking and finance, retail, and general service areas; in some if not all of these areas there is a real need for extended real time applications, where a lack of service for any length of time would lead to a severe user reaction and financial ruin.

The development of the market in the areas of batch and real time operation will depend on:

- National culture.
- National economic trends.
- National business trends.
- World economy.
- National and world competition labour rates.
- Material prices.

Additionally, more and more of the manufacturing industry is using advanced stock control, production, invoicing and shipment (real time) packages and is totally dependent upon the computer for its daily operations.

As an indication, INPUT shows below some of the required fix times

EXHIBIT IV-1

HARDWARE MAINTENANCE & SYSTEMS AVAILABILITY IMPORTANCE & SATISFACTION RATINGS

	HARDWARE MAINTENANCE			SYSTEM AVAILABILITY		
	IMP	SAT	SI	IMP	SAT	SI
Manufacturing: Discrete	9.1	8.3	0.91	9.3	8.8	0.95
Process	9.3	8.4	0.90	9.4	8.7	0.93
Banking & Finance	9.1	8.2	0.90	9.2	8.6	0.93
Insurance	9.3	8.1	0.87	9.3	8.6	0.92
Other Business Services	9.1	8.1	0.89	9.2	8.7	0.95
Distribution: Wholesale	9.3	8.1	0.87	9.3	8.6	0.92
Retail	9.0	7.6	0.84	9.2	8.3	0.90
Education	9.3	8.5	0.91	9.4	8.7	0.93
Central Government	8.8	7.8	0.89	9.4	8.4	0.89
Local Government	9.0	8.2	0.91	9.4	8.8	0.94
Public Sector Health	9.7	9.3	0.96	9.0	9.0	1.00
Law & Order	9.2	8.3	0.90	9.4	8.3	0.88
Public Utilities	9.3	8.2	0.88	9.2	8.9	0.97
Other Services	9.2	8.0	0.87	9.3	8.4	0.90
Transportation	9.3	7.9	0.85	9.2	8.5	0.92
Other	9.5	8.3	0.87	9.6	8.7	0.91
Construction & Building	9.1	8.5	0.93	9.3	8.7	0.94
Average	9.2	8.1	0.88	9.3	8.6	0.92

Satisfaction: 0 = Appalling
10 = Excellent

Importance: 0 = No importance
10 = Top importance

Satisfaction Index (SI): 1 and above = Fully satisfied
.9 and below = Poor

taken from user surveys in the various business sectors:

- Banking: 1 hour
- Point-of-sale: 15 minutes
- Distribution: 30 minutes
- Manufacturing: 2 hours

Although much of the manufacturing industry can run substantially in batch, a significant proportion of its work is now contingent upon real time availability for shop floor control and distribution.

For critical real time applications, in both the service and manufacturing industries, users are becoming adamant that they require two- and three-shift cover and a very quick response within that period.

Not only that, but the computer is now more widely spread throughout offices and factories, and in such "integrated" systems down-time not only costs real money, but also total disruption, and a consequent loss of credibility of the vendor in the marketplace.

Hence, the service maintenance companies in these multi-shift industries will be more and more required to provide round-the-clock service, whether this is remote or on-site, and this will favour those companies with the most technological expertise and resource.

It will also emphasise on contracts 'tailored' to the customer's working requirements, which the major service suppliers are already addressing.

B

Reliability

The main impact on computers of high technology and improved production methods is:

- Smaller hardware for same power.
- Higher reliability.
- Easier repair.
- Distributed computing.
- PCs ported into mainframes or minis—lower hardware cost.

The impact on the customer/user is to encourage the more efficient and extended use of computing power and to expect very little down-time and very little maintenance. Exhibit IV-1 shows the customer ratings for hardware maintenance and systems availability.

It is rather surprising that the levels of importance and satisfaction are within a very small band across the range of industry and commerce and, further, that the finance and retail sectors are among the least satisfactory.

To a large extent, peripherals still suffer from the real and perceived reputation of being mostly mechanical and hence subject to more breakdowns, and users protect themselves by duplication of print-out and storage facilities.

C

Quality

In the world market, Japan has put the pressure for quality products on USA manufacturers. This is now reflected into the UK, where users are beginning to **expect** a reliable, good-looking, and productive product at no increase in cost.

In the UK there will be more and more emphasis on this aspect, particularly as some 25% of product (works) cost is reckoned to go in 'making good' defective materials in the factory.

Users will therefore be looking for vendor conformance to BS5750 or ISO9000 (Good Manufacturing Practice), which covers all aspects of a product from design through production to installation and service.

All the major players have, or will have, registration to BS5750 or ISO9000.

One of the criteria for an effective implementation of a BS5750 servicing strategy will be design for service; this will put increasing pressure on design departments to address the issues of reliability and economic maintenance.

It is likely that the user will become used to having BS5750 sold to him as part of the vendor hardware marketing strategy and will then come to ask for it in its own right, even from a TPM; it will be interesting to see how the TPMs tackle this, particularly in respect of feedback to improve design.

D**Diagnostics**

In order to maintain their service **profit**, rather than revenue, there will be increasing pressure on companies to provide remote diagnostics in order to reduce the number of site calls—and to sell this aspect to the customer.

In this context, more built-in and predictive diagnostics will also be employed, some of these with the intention that the customer himself will do first-line maintenance, hence saving more call-outs.

Without a committed site engineer or the above diagnostic tools, it is not viewed as realistic to achieve a 100% availability required for some real time applications.

Exhibits IV-2 and IV-3 provide evidence that there is a lot to be done in order to achieve both a better customer satisfaction level and a better response and repair level.

On the software side in particular, it can be seen that there are industries which are only just above the 30% ratio of experience to acceptability and others which are theoretically critical applications, i.e. process manufacturing, only just over 50%; this level of service acceptability is open to strong competition.

E**The Costs and Actuality of Maintenance**

The “overhead” expense of providing a higher level of cover, with the same level of maintenance prices, will depend critically upon:

- Machine design.
- Diagnostics.
- Engineer ability.
- Modular replacement.
- Customer training.

As the hardware cost per function decreases, the customer expects more for less, particularly for maintenance; ideally, the customer would like no maintenance at all and no contract to pay for.

In the French and Italian high-tech service markets, there is a growing level of time and material only calls, even in semi-critical applications, due to a customer perception that maintenance contracts are too highly priced and that it is worth the risk.

EXHIBIT IV-2

HARDWARE RESPONSE & REPAIR

SECTOR	RESPONSE TIMES			REPAIR TIMES		
	ACCEP-TABLE	EXPERIENCED	IMPOR-TANCE	ACCEP-TABLE	EXPERIENCED	IMPOR-TANCE
Manufacturing: Discrete	HR	HR	0-10	HR	HR	0-10
Process	3.7	3.8	8.9	3.9	4.1	8.9
Banking & Finance	3.3	3.6	9.1	4.1	4.7	9.2
Insurance	2.1	2.2	9.0	3.1	3.4	9.1
Other Business Services	2.2	2.2	9.1	2.8	3.2	9.1
Distribution: Wholesale	3.6	3.9	9.1	3.7	5.6	9.1
Retail	3.3	4.0	9.3	3.8	4.0	9.4
Education	2.7	3.5	8.9	4.0	4.6	9.0
Central Government	4.2	4.4	9.0	4.6	3.8	9.1
Local Government	3.0	3.1	9.2	2.5	2.7	9.3
Public Sector Health	3.1	3.2	9.2	3.9	5.6	9.0
Public Utilities	3.3	2.3	9.3	1.7	2.0	9.7
Law & Order	2.6	3.3	9.4	2.4	3.1	9.6
Other Services	2.6	2.6	9.2	4.0	4.1	9.2
Transportation	3.9	4.5	9.1	4.6	6.8	9.2
Other	4.5	4.7	9.1	4.9	5.6	9.1
Construction & Building	4.5	5.0	8.8	5.8	5.6	8.9
Averages	4.9	4.9	9.3	4.6	5.9	9.4
	3.5	3.8	9.1	4.0	4.8	9.1

Sample Size: 1,294

EXHIBIT IV-3

**SOFTWARE RESPONSE TIME
ACCEPTABILITY VERSUS EXPERIENCE**

SECTOR	ACCEPTABLE	EXPERIENCED	SI	IMPORTANCE
	HR	HR		0-10
Manufacturing: Discrete	9.5	17.6	0.54	8.7
Process	8.0	15.7	0.51	8.8
Banking & Finance	4.5	7.3	0.62	8.7
Insurance	6.1	11.9	0.51	8.7
Other Business Services	7.2	11.9	0.61	8.9
Distribution: Wholesale	7.2	15.6	0.46	8.8
Retail	9.0	15.5	0.58	8.3
Education	37.1	44.5	0.83	8.1
Central Government	9.5	9.5	1.00	8.7
Local Government	13.2	23.2	0.57	8.9
Public Sector Health	4.3	4.0	1.08	8.7
Law & Order	8.2	25.0	0.33	8.5
Public Utilities	8.3	25.1	0.33	8.4
Other Services	12.7	34.1	0.37	8.7
Transportation	9.0	15.0	0.60	8.9
Other	9.9	16.2	0.61	8.2
Construction & Building	8.1	9.0	0.90	9.3
Averages	10.1	17.7	0.56	8.7

One working day equivalent to eight hours

SI = Satisfaction Index where 1 shows complete satisfaction

Sample Size: 1,294

To the initial vendor there is also the pressure due to severe competition from both local and national TPMs, who can generally operate at a lower overhead cost.

Very low prices for maintenance, from very small local TPMs, can depress the market opportunities for the bigger companies and actually prevent the release of extra good facilities.

What is evident is that these bigger companies need to actively **sell** both the basic contract and any extra facilities. This may not be too difficult, as the user research shows that many hardware customers are seeking new services in the areas of operating software training and applications software training.

As part of the changing scene, the manufacturers have been putting significant effort into the raising of quality levels in design and production, and this has resulted in much more reliable equipment, with higher MTBF and MTTR figures.

This has had knock-on effects on the service market and has increased the need for markets and services differentiated by such things as diagnostics, cover, software support, and costs.

Exhibit IV-4 shows some major aspects of the changing commercial and technological scene.

EXHIBIT IV-4

THE CHANGING SCENE

- More Reliable Equipment
- High MTBF, Low MTTR
- BS5750 Will Begin to Bite
- More Remote Diagnostics
- More Built-In Diagnostics
- 24-Hour Cover and Quicker Response
- More Pressure on Service Costs
- More TPM Competition
- More Software Support Required



User Feelings

—



User Feelings

A

Customer Care

INPUT research shows that more and more users are looking for a caring vendor whose interest in the customer doesn't vanish as soon as the contract is signed.

To cater to this aspect, most of the major companies have invested significant sums of money in putting their engineers through either a PR course or a 'charm school', as the engineer is sometimes the only company representative the customer sees for long periods, and that is at a time of high stress, i.e. when the machine or other equipment is down.

Increasingly, the potential customer is also seeking:

- A salesman or back-up who can talk over the technical detail.
- Ongoing information on new equipment, applications, and service.
- Ongoing training.

INPUT finds it somewhat surprising, for the second year in succession, that there appears to be significant sections of the user requirement market which are not addressed, at a time of severe competition (refer also to Exhibits VII-1 to VII-4).

This is particularly surprising in view of the many posters in many of the larger companies which have messages such as:

- "THE CUSTOMER IS KING"
- "THE CUSTOMER PAYS OUR BILLS"

B**Reliability and Cost**

All the research shows that the customer is very sensitive about:

- Down time.
- Response time.
- Repair time.

The customer feelings are that, since the vendor has sold him a reliable, good-looking machine, this machine should not go wrong at all, and if it does fail on a very infrequent cycle, it should be repaired so quickly that the business is unaffected.

The respondents' ratings based on the ratio of satisfaction to importance are, in fact, quite good, but with the 'up-time-important' factors such as spares availability, documentation quality, and engineer skills at the bottom of the heap; the ratios are given in Exhibit V-1.

As discussed above, to the vendor or manufacturer this entails getting the design and the service right, so there can be an achievable high MTBF and a low MTTR.

As a corollary to this aspect, the cost of warranty is now more often charged to production, so there is even more pressure on the production line to get it right first time and also to get the overall quality level up, even to the extent of referring quality and performance problems back to design during manufacture.

C**Cover and Response**

As the incidence of computers in the workplace increases, a quick response during the working day is viewed as essential, and this sometimes extends into weekends, although there is a clear pattern that France likes to keep its weekends free.

In the capital intensive and in the round-the-clock service industries, the move from single shift to double shift, and from double to three-shift systems, is maintaining its impetus, and it is the strong belief of INPUT that this trend will continue.

Hence the vendors will need to develop their strategies for dealing with these situations:

EXHIBIT V-1

ASPECTS OF HARDWARE MAINTENANCE IMPORTANCE VERSUS SATISFACTION

EXISTING SERVICES	IMPORTANCE	SATISFACTION	SI
Service Administration	7.4	7.4	1.00
Operator Training	7.7	7.5	0.97
Spares Availability	8.9	8.0	0.90
Escalation Procedure	8.3	7.6	0.92
Engineer Skill Level	8.8	8.3	0.94
Remote Diagnostics	6.8	6.8	1.00
Telephone Support	7.6	7.4	0.97
Documentation Quality	7.3	6.7	0.92
Planning/Consultancy, Etc.	7.1	7.1	1.00
Out-Of-Hours Service	6.8	6.8	1.00
Call Handling	8.2	7.8	0.95
Back-up Support	8.2	7.8	0.95

SI = Satisfaction Index where 1 indicates complete satisfaction
Ratings 0-10

Sample Size: 1,294

- Round-the-clock or tailored site cover.
- Premium rates for extended service.
- More reliable equipment.
- More site spares.
- More remote and built-in diagnostics.
- More customer self-help.
- Time & material, call-out only.
- Sell-off of second and third shift cover.
- Sell off of all cover.

Another item, referred to above and in the users' minds, is the perceived skill level of the service engineer, and this is an issue which INPUT believes needs to be addressed quite vigorously:

- Is it engineer training or engineer ability?
- Is it machine repairability or design?
- Is it poor diagnostics?
- Or is it just poor PR?
- Or lack of spares giving a bad impression?

D

Software Training and Productivity

Exhibit V-2 shows the relative importance attached to software support in each discrete area of business activity; it would appear that law and order are the worst served and central government the best. Even though the ratings are all high, there is still an apparent customer feeling that the service given does not match up with that required. This is an area to be monitored in case the competition creeps, or gallops, in.

More detailed responses are given in Exhibits V-3 and V-4, where the service is broken out by specific supplier. The high ratings given, overall,

EXHIBIT V-2

SOFTWARE SUPPORT IMPORTANCE VERSUS SATISFACTION

	IMPORTANCE	SATISFACTION	SI
Manufacturing: Discrete	8.8	7.9	0.89
Process	8.8	8.2	0.93
Banking & Finance	8.7	7.8	0.90
Insurance	8.9	7.7	0.87
Other Business Services	8.5	7.8	0.92
Distribution: Wholesale	8.6	7.6	0.88
Retail	8.5	7.3	0.86
Education	8.2	7.8	0.95
Central Government	8.4	8.4	1.00
Local Government	8.9	7.6	0.85
Public Sector Health	9.3	8.7	0.93
Law & Order	9.2	7.5	0.82
Public Utilities	8.9	7.9	0.89
Other Services	8.4	7.3	0.87
Transportation	8.9	8.2	0.92
Other	8.7	7.4	0.85
Construction & Building	8.5	8.1	0.95
Averages	8.7	7.8	0.90

SI = Satisfaction Index where 1 indicates complete satisfaction

Ratings 0-10

Sample Size: 1,294

EXHIBIT V-3

**SOFTWARE SUPPORT -
IMPORTANCE VERSUS SATISFACTION (1)**

	SOFTWARE INSTALLATION		TECHNICAL SKILL		TELEPHONE SPEED OF FIX		OTHER SUPPORT		ON-SITE	
	IMP	SAT	IMP	SAT	IMP	SAT	IMP	SAT	IMP	SAT
IBM	8.0	7.6	8.7	8.2	8.4	7.2	7.7	7.1	8.0	7.3
DEC	8.2	8.0	8.9	8.2	8.1	7.4	7.2	7.2	7.4	7.3
COMPAREX	8.2	7.8	8.2	7.0	8.0	6.5	6.2	6.5	7.6	5.8
OLIVETTI	7.9	8.0	8.8	8.2	7.9	7.3	7.0	7.5	7.8	7.9
HONEYWELL/ BULL	8.0	7.8	8.9	8.0	8.0	7.1	7.0	6.9	8.2	7.3
UNISYS	7.9	7.5	8.7	7.9	7.9	7.3	7.2	7.0	7.5	7.0
PHILIPS	8.1	8.1	9.1	8.4	7.4	6.3	6.7	8.1	8.0	7.4
ICL	8.0	7.8	8.8	8.1	7.8	7.1	6.9	6.7	7.2	7.3
HP	7.9	8.1	8.8	7.6	8.2	8.0	7.1	7.6	7.3	7.5
NCR	7.5	7.4	8.7	8.1	7.8	7.4	6.4	6.6	6.7	6.8
WANG	8.2	7.3	9.1	7.9	8.4	7.1	7.4	6.9	7.7	6.7
SIEMENS	7.7	7.5	8.1	8.0	7.9	7.4	7.4	7.3	8.1	7.7
ITL	8.1	8.5	8.4	8.4	7.3	7.4	6.8	7.3	7.4	7.7
NIXDORF	7.8	7.4	8.6	8.1	8.1	7.7	6.4	6.6	7.2	7.2
Averages	7.9	7.7	8.8	8.1	8.0	7.3	7.1	7.0	7.5	7.3
SI (Average)		0.97		0.92		0.91		0.99		0.97

SI = Satisfaction Index where 1 indicates complete satisfaction
Ratings 0-10

Sample Size: 1,294

EXHIBIT V-4

SOFTWARE SUPPORT IMPORTANCE VERSUS SATISFACTION (2)

	HOTLINE		CAPACITY TUNING		REMOTE DIAGNOSTICS		PROBLEMS DATABASE	
	IMP	SAT	IMP	SAT	IMP	SAT	IMP	SAT
IBM	8.1	7.3	7.9	7.3	7.2	6.9	7.1	7.0
DEC	7.5	7.4	7.7	7.4	6.3	6.6	5.8	6.4
COMPAREX	8.0	7.5	6.8	6.0	2.6	0	2.8	5.0
OLIVETTI	7.4	7.3	8.0	7.4	7.4	6.8	7.4	7.5
HONEYWELL/BULL	7.7	7.2	7.8	7.4	7.0	6.6	7.0	6.9
UNISYS	7.9	6.9	7.6	7.5	6.6	6.4	6.9	6.4
PHILIPS	5.8	6.4	8.5	8.2	5.6	6.0	6.6	7.1
ICL	7.5	7.4	7.5	7.2	6.8	6.8	6.9	6.9
HP	8.0	7.9	7.9	7.6	7.6	7.6	7.1	7.2
NCR	7.3	7.0	6.7	6.8	6.0	6.0	5.6	6.1
WANG	7.4	6.8	8.0	7.3	5.4	4.4	5.7	5.0
SIEMENS	7.9	7.9	7.4	7.4	6.6	6.4	5.1	4.2
ITL	7.4	7.7	7.4	7.8	7.5	7.7	7.7	7.9
NIXDORF	7.5	7.3	6.8	7.3	7.2	7.5	6.2	6.7
Averages	7.7	7.3	7.6	7.3	6.7	6.6	6.5	6.6
SI (Average)		0.95		0.96		0.99		1.01

SI = Satisfaction Index where 1 indicates complete satisfaction
Ratings 0-10

to problems management and remote diagnostics reflect, in the view of INPUT, the user concern over down time.

Here again, as with hardware engineers, the software engineer's skills have nearly the lowest satisfaction rating, with telephone support taking that dubious honor.

It is worth noting that, in 1988, IBM is proposing to discontinue telephone support and move over to expert systems, diagnostics, and self-help; this is the beginning of a trend, in the view of INPUT, and will provide both an opportunity and a problem for the smaller service company. The current customer levels of telephone support are shown in Exhibit V-5.

An examination of the fix times for software shown in Exhibit V-6 indicates a good deal of dissatisfaction and some very lengthy repair cycles; again, banking, finance, and transport are rather surprising candidates for the worst experiences.

E

Summary of Prime User Requirements

Exhibit V-7 summarizes the prime requirements stated by users, and these requirements reflect the fact that the key concern is up-time and availability.

In the view of INPUT, it is essential that the service vendors, when considering the provision of new, better, or differentiated services, also consider that, in the users' eyes, the most important aspect is that the system must be up and running when required.

EXHIBIT V-5

SOFTWARE SUPPORT BY TELEPHONE
(Percent Problems Solved by Phone)

SECTOR	PERCENT
Manufacturing: Discrete	54
Process	54
Banking & Finance	44
Insurance	53
Other Business Services	53
Distribution: Wholesale	54
Retail	55
Education	51
Central Government	32
Local Government	56
Public Sector Health	52
Law & Order	63
Public Utilities	55
Other Services	50
Transportation	43
Other	38
Construction & Building	52
Average	50

Sample Size: 1,294

EXHIBIT V-6

FIX-TIME ACCEPTABILITY FOR SOFTWARE

SECTOR	ACCEPTABLE HOURS	EXPERIENCED HOURS	IMPORTANCE 0-10	SI
Manufacturing: Discrete	11.6	19.9	8.6	0.6
Process	11.1	16.8	8.9	0.7
Banking & Finance	9.1	21.8	9.0	0.4
Insurance	9.9	15.0	8.9	0.7
Other Business Services	8.7	16.0	8.8	0.5
Distribution: Wholesale	10.3	19.5	8.9	0.5
Retail	11.6	14.9	8.3	0.8
Education	27.0	32.9	8.2	0.8
Central Government	32.5	44.3	8.7	0.7
Local Government	7.4	15.1	8.6	0.5
Public Sector Health	8.0	7.0	9.3	1.1
Law & Order	10.4	15.3	9.1	0.7
Public Utilities	12.2	21.4	8.9	0.6
Other Services	10.9	28.0	8.6	0.4
Transportation	11.8	28.1	9.3	0.4
Other	14.2	20.9	8.5	0.7
Construction & Building	8.3	9.5	8.8	0.9
Averages	11.1	20.3	8.8	0.5

Note: 0.5 for a Satisfaction Index (SI) indicates very poor overall satisfaction.

Sample Size: 1,294

EXHIBIT V-7

PRIME USER REQUIREMENTS

- Higher MTBF at Lower Service Cost
- Lower MTTR at Lower Service Cost
- 1, 2 and 3 Shift Cover
- Parts and Labour Cover only, but Very Quick Response
- Better, More Skilled Engineers
- More Software Support
- More Applications Support
- More, and Better, Training
- Better Efficiency, Better Productivity



Manufacturers and Vendor Response to User Feelings



VI

Manufacturer and Vendor Response to User Feelings

A**Technology**

Although there is a dichotomy between designing for increased machine reliability and increased service revenue (and profit), the marketplace (in the form of more and more educated users) will demand a higher-reliability machine, except for the instances in the low end of the PC market where the unit can be treated as consumable.

Hence, in designing a better quality and more reliable machine, the designers will also make servicing easier, and less expensive, by putting in more diagnostics, easier access, modular replacement, and customer self-monitoring facilities.

In addition, as is happening in ICL, there will be a trend towards better databases of fault history, perhaps on-line to the service engineer on a call, so that recurrent faults can be more easily identified and the means of rectification recorded.

On the quality aspect, it is a requirement of Good Manufacturing Practice (ISO9000 Europe: BS5750 UK) that data is fed back to design so that the product can be improved, and this will speed up changes for the better in production and design technology.

B**Cover and Response**

INPUT observes a general feeling among vendors that, as service revenue and profit is the mainstay of the business, (some 20 to 40% of revenue for major hardware suppliers), service cannot be used as a loss-leading product, and hence that maintenance must be correctly costed, and sold at a 'correct' price level.

Therefore, any extension of cover must be paid for; in this context a significant percentage of random out-of-hours calls, on a time and materials basis, cannot be acceptable for a planned service operation.

Specifically, it is felt that customers will have to be willing to pay for whatever service is necessary to cover real time applications where it is not possible to continue in business without the computer being available within one hour of machine break. And, it is not proposed to lower prices.

Some TPMs have entered into this market by sub-contracting one of their engineers to work on the customer's site, an expense which the major hardware supplier may not be able to justify or resource, and is likely to tackle in a different manner. Their approach will be to lower service costs by the use of modern and better technology to a competitive level, and this will be the price offered to the user.

As an alternative to a maintenance contract, the vendors will be offering longer response time and more expensive time and material call-out procedures, which will be pitched to both meet the competition and encourage the customer towards a "proper" contract.

In addition, the vendor will sell preventative maintenance with, in some cases, the consumable parts paid for by the customer, which will help to cover the overhead cost of the engineer, who will also be used as the 'window on the company.'

In order to ensure that the customer is satisfied at the outset, each installation will be bench-marked to a set of data from the factory system test, and this will be used to ensure maintenance of output quality during subsequent maintenance.

C

The Future, from Current Maintenance Perceptions

Exhibits VI-1 and VI-2, broken down by supplier, show that only some 45% of users rate the service they expect to be given in five years time as excellent. Presumably this rating is reflected from current performance and requires investigation and remedy by the service vendors concerned.

Another 11% reckon that the service will be about the same as now, with 16% who do not have a view.

EXHIBIT VI-1

CUSTOMER RATING OF SUPPLIERS SERVICE (1)

	SAMPLE SIZE	RATINGS										
		1	2	3	4	5	6	7	8	9	10	11
IBM	210	102	8	15	8	11	15	7	13	4	12	8
DEC	193	97	8	7	4	11	21	2	7	4	5	3
COMPAREX	5	1			1		1					
OLIVETTI	28	7			2	1	2		1	1		
HONEYWELL/BULL	115	45	3	2	8	6	5	2	5	2	10	
UNISYS	111	44	2	1	3	2	8	2	8	1	5	1
PHILIPS	11	3	1	1					1		1	1
ICL	197	101	1	10	17	5	7	4	11	11	5	2
HP	97	38	1	1	4	3	13	3	4	1	1	1
NCR	121	58	2	1	5	2	9	5	11		2	
WANG	59	23		2	6	3	6	1	5	1	2	
SIEMENS	48	20			1	1	8					1
ITL	30	19	1	4	1			3	4			
NIXDORF	69	22	1		2	2	14	3	4			
Totals for each rating	1294	580	28	44	62	47	109	32	74	25	43	17

1 Excellently

7 OK

2 Well

8 Poor

3 Good company, so should be well

9 Won't cover needs

4 Mainly well

10 Have problems at the moment

5 Keeping up, so should be OK

11 Too expensive

6 Hope they will improve on current performance

Question: How well do you think your current vendors will be able to supply your requirements in five years' time?

EXHIBIT VI-2

CUSTOMER'S RATING OF SUPPLIER'S FUTURE SERVICE (2)

	SAMPLE SIZE	RATINGS				
		12	13	14	15	16
IBM	210		24	8	2	22
DEC	193		20	7	1	29
COMPAREX	5		2			
OLIVETTI	28	1		4		11
HONEYWELL/BULL	115		20	16		17
UNISYS	111		10	9	1	25
PHILIPS	11		3	1		2
ICL	197	2	12	32	1	18
HP	97		12	6		16
NCR	121		11	12		15
WANG	59		4	5	1	8
SIEMENS	48		15			5
ITL	30			7		1
NIXDORF	69		11	6		8
Totals for each rating	1294	3	144	113	6	177

- 12 Not keeping up, so poor
- 13 Same as now
- 14 Will have different equipment by then
- 15 Others
- 16 Don't know

For a comparative performance rating a ratio of the number in the 'excellent' column to the machine sample can be taken, and it is rapidly seen that some suppliers are rated much better than others:

- DEC 50%
- IBM 49%
- NIXDORF 32%
- OLIVETTI 25%

In order to improve 'image' and retain or capture market, service vendors will be tailoring and improving their services and, as discussed above, concentrating on service technology so as to maximize up-time while minimizing site visits.

As a selling point, customers with maintenance contracts will be offered free software updates, but these will be charged to other customers.

In addition, various goodies, perhaps in the areas of machine processing speed and operating facilities, will be incorporated in these packages to further help the potential customer choose the right route.

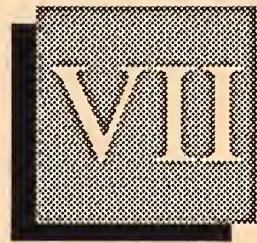
Wherever possible, hardware and software maintenance will be bundled to ensure that revenue is maximized and the customer constrained to make the right choice.

The strategy on the part of the vendor will, therefore, be very much as indicated in Exhibit VI-3, in order to satisfy the prime user requirement of good system availability (at a fair price), and this, if implemented correctly and energetically, should ensure better perceptions of the future throughout the current customer base.

EXHIBIT VI-3

STRATEGIC POSSIBILITIES

- Use Better Technology to Lower Costs
- Increase Remote and Built-In Diagnostics
- Fault Databases to Shorten MTTR
- Shorten Response and Repair Times
- Offer Longer, and More Expensive, Call-Out
- Sell Preventive Maintenance
- Sell Upgrades (Incorporate Goodies)
- Use Modular Replacement
- Bench Mark Installation
- Bundled Software/Hardware



Today's Opportunities

—

VII

Today's Opportunities

A

The Business of Maintenance

Because, in general, only the bigger companies have the technology to make efficient and reliable machines, those companies will dictate, in a technical sense, how they are maintained.

Outside, TPMs will need to have a broad technical spread of ability, and also a broad geographic spread in order to meet the competition in the marketplace. This will tend to drive out the local non-specialist, who typically will have less capital to be able to keep in the game, and the larger TPM will either squeeze the smaller firm out, or take it over to spread its base.

It is also probably not viable for the smaller firm to deal with one aspect, such as software, as the user is turning to "one-stop" installation and maintenance shopping. The emphasis, therefore, will be for larger and more concentrated firms, whether these are vendors, manufacturers, or TPMs.

B

The Practice of Maintenance

The technology exists to design and manufacture an easily maintained machine; with the increased visibility of quality requirements via BS5750, machines will eventually cost less to maintain.

The choice will be of strategy, between the de-skilled maintenance engineer and lots of simple diagnostics and the super engineer with a faults database. These can be backed up by policies of discounting maintenance for self-help and remote diagnostics. For the customer who really likes to live dangerously, time and material agreements can be priced to cover the extra cost, to the vendor, of having expensive labour on call.

It may also be possible, for the more recalcitrant customer, to sell an extended warranty as an insurance policy; this will keep the customer on the books at least, until the time for a proper contract arrives.

In addition, by referencing to the user requirement for more software and applications support, it should be possible to sell extended hardware/software contracts, but this will take resource and will need funding prior to launch.

C

Further Maintenance

As businesses become "locked-in" to the computer they become more and more susceptible to disaster:

- Loss of files.
- Sabotage.
- Union activity.

There is an opportunity to sell, as part of maintenance, forms of disaster recovery:

- File recovery.
- Back-up computer.
- Back-up computer facilities.

It is also possible, as part of installation, to sell the turnkey solution, where the computer is installed with its operating software and applications software running and benchmarked prior to hand-over.

With the engineer's knowledge of the customer and his system, consultancy could be offered, either as part of an up-costed maintenance contract or as a separate facility.

In addition, to respond to the user-stated requirement, consideration could be given to an offer of facilities management as a whole.

1. Extra or Other Services

The response to the question for Strength of Interest (SOI) in given services, is shown in Exhibit VII-1; the figure is rounded to the nearest whole number.

In general, responses below seven demonstrate a marginal interest in the service, but two other points should be considered:

- Are those without the service the better market opportunity?
- Would a greater number of potential customers with a lower than seven rating give a better market opportunity than the converse?

It is the view of INPUT that prime areas for new opportunity based on probability analysis will be:

- Network planning.
- Disaster recovery.
- Network management.
- Problems management.

EXHIBIT VII-1

INTEREST LEVELS FOR OTHER SERVICES (1)

SECTOR	CONFIGURATION PLANNING		CAPACITY PLANNING		ENVIRONMENTAL PLANNING	
	Number With Service	SOI	Number With Service	SOI	Number With Service	SOI
Manufacturing: Discrete	191	6	186	6	184	6
	119	6	118	6	105	6
Banking & Finance	54	6	45	6	40	5
Insurance	32	6	31	6	28	6
Other Business Services	81	5	79	6	84	5
Distribution: Wholesale	52	6	47	6	44	5
	28	6	24	6	25	5
Education	12	5	11	6	12	5
Central Government	12	6	11	6	13	5
Local Government	25	6	28	6	27	6
Public Sector Health	1	5	1	6	1	6
Law & Order	10	6	6	6	9	5
Public Utilities	14	6	10	6	12	5
Other Services	40	6	43	6	39	5
Transportation	13	6	13	6	7	5
Other	8	6	5	6	5	4
Construction & Building	13	6	17	7	11	6
Totals/average SOI	705	5.9	675	6.0	646	5.4

SOI I=Strength of interest on scale 0-10;
scores of 7 and above represent significant interest

Sample Size: 1,294

EXHIBIT VII-2

INTEREST LEVELS FOR OTHER SERVICES (CONT'D)

SECTOR	SOFTWARE EVALUATION		TRAINING		CONSULTANCY	
	Number With Service	SOI	Number With Service	SOI	Number With Service	SOI
Manufacturing: Discrete	138	6	321	7	206	6
	71	6	225	7	132	6
Banking & Finance	40	6	87	7	52	6
Insurance	20	7	50	7	30	7
Other Business Services	72	6	160	7	83	6
Distribution: Wholesale	38	5	108	7	55	6
	27	6	50	7	26	6
Education	9	5	23	6	9	5
Central Government	8	6	18	8	14	7
Local Government	20	6	46	7	24	6
Public Sector Health	2	8	3	8	3	8
Law & Order	7	7	18	7	11	7
Public Utilities	8	6	29	8	19	6
Other Services	32	6	74	7	33	6
Transportation	9	7	31	7	18	7
Other	7	6	15	8	8	7
Construction & Building	15	7	32	7	18	7
Totals/average SOI	523	6.0	1290	7.1	741	6.3

SOI = Strength of interest

Sample Size: 1,294

EXHIBIT VII-3

INTEREST LEVELS FOR OTHER SERVICES (CONT'D)

SECTOR	NETWORK PLANNING		NETWORK MANAGEMENT		DISASTER RECOVERY	
	Number With Service	SOI	Number With Service	SOI	Number With Service	SOI
Manufacturing: Discrete	105	6	106	6	141	7
	72	6	74	6	91	7
Banking & Finance	33	6	30	6	42	7
Insurance	16	6	13	6	17	7
Other Business Services	54	5	50	5	70	7
Distribution: Wholesale	23	5	20	5	35	6
	15	5	19	6	24	7
Education	9	5	9	5	7	5
Central Government	9	6	7	6	10	6
Local Government	17	6	16	6	23	7
Public Sector Health	1	7	1	7	-	-
Law & Order	8	6	6	6	8	6
Public Utilities	12	6	12	6	10	7
Other Services	29	6	29	6	26	7
Transportation	6	6	7	6	11	7
Other	5	6	4	5	7	7
Construction & Building	8	6	10	6	11	7
Totals/average SOI	422	5.8	413	5.7	598	6.9

SOI = Strength of interest

Sample Size: 1,294

EXHIBIT VII-4

INTEREST LEVELS FOR OTHER SERVICES (CONT'D)

SECTOR	MEDIA SERVICES		FACILITIES MANAGEMENT		PROBLEMS MANAGEMENT	
	Number With Service	SOI	Number With Service	SOI	Number With Service	SOI
Manufacturing: Discrete	163	5	79	5	123	6
	68	5	51	4	86	6
Banking & Finance	44	5	19	4	28	5
Insurance	17	5	6	4	18	6
Other Business Services	95	5	29	3	44	4
Distribution: Wholesale	49	5	18	3	27	5
	34	5	7	4	12	4
Education	12	5	5	3	5	4
Central Government	9	5	6	4	9	5
Local Government	31	5	9	3	12	4
Public Sector Health	2	6	-	-	-	-
Law & Order	9	6	2	4	6	5
Public Utilities	12	5	5	4	11	5
Other Services	39	5	15	4	26	5
Transportation	15	6	7	4	10	6
Other	8	6	1	4	7	6
Construction & Building	14	5	5	5	7	6
Totals/average SOI	621	5.1	319	4.0	404	5.2

SOI = Strength of interest

Sample Size: 1,294



Summary

—



Summary

An examination of the user replies and the various exhibits shows that the prime user consideration is to have the system up and running whenever it is needed.

This need not be the total system in all cases, and various vendors are putting forward service contracts tailored to the specific user requirements.

Where the customer is particularly sensitive to interruptions engineers are being allocated to site on a permanent basis; TPMs in particular are subcontracting engineers permanently for this service.

However, the bigger manufacturers are not keen on this approach as the engineer tends to get bored and 'moves on' quite quickly, thus pushing up the training costs and perhaps passing company knowledge on to a competitor.

According to the customer perceptions, the availability of spares to remedy systems or unit down situations, is 10% undersatisfied: vendors need to examine their stocking and obsolescence policies in order to give better service.

There is also a perceived underachievement in the escalation procedure, and perhaps the actual procedure that is working is not visible enough to the customer; at a time the customer is in a tense situation (equipment down) it is necessary to keep him fully informed and also, of course, to meet his expectations in respect of fix time.

On the software side it is again the skills and services related to system availability which score highest, including engineer skills, and this is undersatisfied with the customer to the tune of some 8%. Hence, vendors should be concentrating on the 'availability' aspect in both the hardware and software services.

When reading the figures for importance and satisfaction ratings, it is important to note that the degree of satisfaction (or the ratio of satisfaction to importance) is inversely related to the psychological importance in the following way:

- When a service becomes fully satisfied it ceases to be a problem and is given less importance in the mind of the user.
- Where a service is being poorly attended to by the vendor, this lack of attention assumes undue importance to the user, who gives it high importance and (always) a lower satisfaction rating.

Hence, remote diagnostics and out-of-hours service, which are 100% satisfied in the current survey, are below even the tenth position in the ranking table.

In the question for the strength of requirement for extra services, only training had a significant interest level, and 7 of nearly 100% of the respondents needed more of it. This still remains, a year on, as the largest unsatisfied demand.

At the other end of the scale, facilities management, at 4.0, is marginal.

Manufacturing vendors can take heart from the fact that some 82% of all respondents believe that the manufacturer is the best vendor of service but, within the total market, 18% is a big number in the revenue stakes and should not be neglected.

Conversely, the independent contractors are only just dependant upon the cost criteria for getting their business, and the convenience and efficiency seen in TPM by the customers must be matched by the big players.

In this context it is worth noting that some 59% of all users would prefer to have 'one-shop' maintenance. Vendors must assess and clarify their options in this field.

Of all the figures in the survey, those representing software fix times are among the best in public health and central government, and are the worst in law and order and public utilities—with the average figure being 80% and 8 hours over the acceptable times.

As to expectations of the level of service which the customers believe that their current supplier will be giving some five years into the future, there are only 45% that believe that it will be excellent. This, in the view of INPUT, shows that immediate attention should be paid to improving the image of current vendors.

As to the current players in the market and, by reason of the rapid and expensive changes in design and service technology, competition will become even more intensive, and those players without the reserves of cash and resource will be squeezed out of all but narrow niche markets.

This implies that big will get bigger, and more cost-effective services will be supplied only by the large company, dealer, or TPM.

Technology is changing rapidly, and it is essential that service both contributes to current design and maintainability processes and also plans the strategy for tomorrow's techniques.

An important consideration in this context is the superengineer versus the de-skilled engineer, but both types of engineer will need intensive training in order to be able to satisfy the customer, and part of this training should incorporate customer relations as an important topic. The engineer will be seen as the window on the company and any future success with ongoing custom may depend critically on this interface.

The markets, as well as growing very rapidly, are changing with the technology; it is essential that market business direction is followed as closely as maintenance technology.

In this context, it is important to note that the economies of individual European countries are not identical, and neither are these always identical to the world economy. Different opportunities exist at different times in different countries, and good planning maximizes these opportunities.

On top of this, it is also important to note that there are significant cultural differences between nations, and a movement of an economy does not mean in itself that the market opportunity is better or worse.

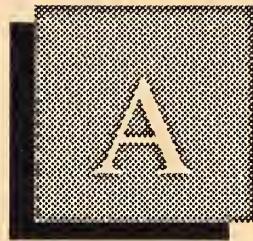
When the market opportunities are properly defined, and the maintenance response properly planned, it will be possible to use the see-saw effect to stabilize the maintenance resource and optimize revenue; i.e., when one market goes up, there may be another going down.

And, finally, real life situations never turn out quite as planned. Keep a set of tactics behind the strategy!

EXHIBIT VIII-1

TODAY'S OPPORTUNITIES

- Concentrate to Dominate
- Real Time Can Mean Real Revenue
- Engineer Company Window on Future Sales
- Extended Warranties
- No-Call Discounts
- Remote Diagnostics Discount
- Self-Help Discounts
- Extended Software Training
- Extended SW/HW Support
- Disaster Recovery
- Back-Up Systems
- Facilities Management
- Turnkey Installations
- Consultancy



Appendix

—



Appendix

EXHIBIT A-1

NUMBER OF RESPONDENTS IN EACH CELL

SECTOR	UK	France	Italy	Norway	Denmark	Sweden	Holland	Belgium	Germany
Manufacturing: Discrete	78	25	52	8	4	15	30	31	80
Process	22	66	21	8	1	15	4	14	74
Banking & Finance	25	18	12	2	-	9	7	6	8
Insurance	13	10	-	1	1	1	5	11	8
Other Business Services	75	18	12	9	7	5	18	10	7
Distribution: Wholesale	35	23	1	3	4	17	2	6	17
Retail	21	2	1	2	3	4	13	2	2
Education	7	6	2	1	-	-	4	1	2
Central Government	6	2	-	1	-	-	1	1	7
Local Government	34	10	1	-	-	-	-	-	1
Public Sector Health	2	-	-	-	-	-	1	-	1
Law & Order	9	3	2	2	-	-	1	1	-
Public Utilities	8	4	2	4	1	1	3	2	5
Other Services	26	13	11	4	1	4	7	6	2
Transportation	9	15	2	-	-	-	2	1	2
Other	2	3	5	-	-	-	-	3	2
Construction & Building	8	8	5	1	1	3	-	-	6
Totals	380	226	129	46	23	74	98	95	224

